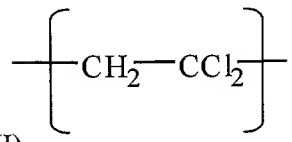
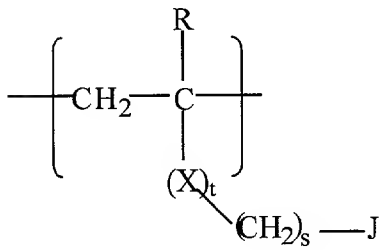
WHAT IS CLAIMED IS:

1. An oxygen barrier composition, comprising:

an oxygen barrier copolymer comprising repeating units having the formula (I), and repeating units having formula (II),



(I)



(II)

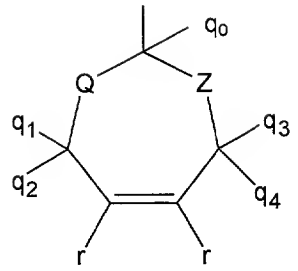
wherein R is hydrogen or methyl; X is –(C=O)-O-, -O-(C=O)-, -(C=O)-NH-, -O-; t is 0 or 1; s is an integer between 0 and 12, inclusive; J is a cycloalkenyl group; and

wherein the composition comprises at least about 50 mole% of repeating units having formula (I) and at least about 2 mole% of repeating units having formula (II).

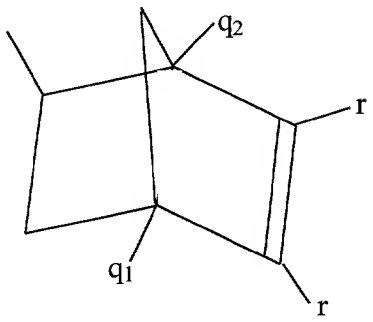
2. The composition of claim 1, wherein the oxygen barrier copolymer comprises 50 mole% of repeating units having formula (I) and at least about 5 mole% of repeating units having formula (II).

3. The composition of claim 1, wherein J is selected from substituted cyclohexenyls, unsubstituted cyclohexenyl, substituted norbornenyls, and unsubstituted norbornenyl.

4. The composition of claim 1, wherein J is selected from chemical groups having the formula (VI) or the formula (VII)



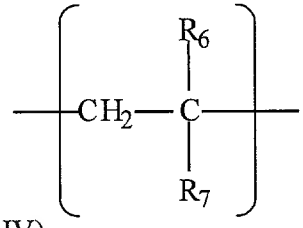
(VI)



(VII)

wherein Q is $-(CR_2R_3)_n-$; n is an integer from 0 to 3, inclusive; Z is $-(CR_4R_5)_e-$; e is an integer from 0 to 3, inclusive; $n + e \leq 3$; q_0, q1, q_2, q_3, q_4, r, each R_2, each R_3, each R_4, and each R_5 are independently selected from hydrogen, linear C_1-C_{20} alkyls, branched C_1-C_{20} alkyls, cyclic C_1-C_{20} alkyls, polycyclic C_1-C_{20} alkyls, aromatic groups, halogens, and sulfur-containing substituents; in formula (VI) when r is hydrogen at least one of q_1, q_2, q_3, and q_4 is hydrogen; and in formula (VII) when r is hydrogen at least one of q_1 and q_2 is hydrogen.

5. The composition of claim 1, wherein the copolymer further comprises a plurality of units having formula (IV)



(IV)

wherein R_6 is hydrogen or methyl, and R_7 is –CN or -COOR", and wherein R" is H or a C_1-C_6 alkyl.

6. The composition of claim 5, wherein R_7 is -COOH or $-COOCH_3$.

7. The composition of claim 1, wherein the composition further comprises an oxidation catalyst.

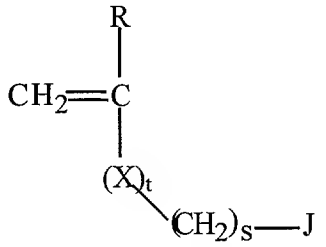
8. The composition of claim 7, wherein the oxidation catalyst comprises a transition metal selected from cobalt, copper, nickel, iron, manganese, rhodium, or ruthenium.

9. The composition of claim 1, further comprising at least one material selected from photoinitiators and antioxidants.

10. The composition of claim 1, wherein the composition comprises a polymer blend comprising a polyvinylidene chloride polymer.

11. A method of preparing an oxygen barrier copolymer, comprising:

reacting a plurality of monomers to produce an oxygen barrier copolymer, wherein the plurality of monomers comprises vinylidene chloride monomer and vinyl monomers having formula (III)



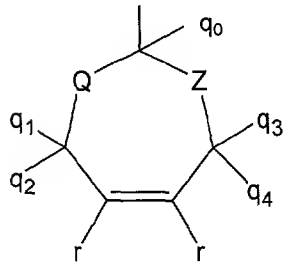
(III)

wherein R is hydrogen or methyl; X is –(C=O)-O-, -O-(C=O)-, -(C=O)-NH-, -O-; t is 0 or 1; s is an integer between 0 and 12, inclusive; J is a cycloalkenyl group; and

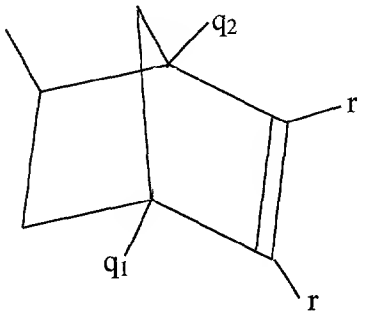
wherein the plurality of monomers comprises at least about 50 mole% of vinylidene chloride monomers and at least about 5 mole% of vinyl monomers having formula (III).

12. The method of claim 11, wherein J is selected from substituted cyclohexenyls, unsubstituted cyclohexenyl, substituted norbornenyls, and unsubstituted norbornenyl.

13. The method of claim 11, wherein J is selected from chemical groups having the formula (VI) or the formula (VII)



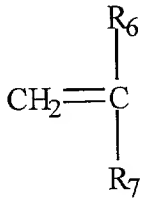
(VI)



(VII)

wherein Q is $-(CR_2R_3)_n-$; n is an integer from 0 to 3, inclusive; Z is $-(CR_4R_5)_e-$; e is an integer from 0 to 3, inclusive; $n + e \leq 3$; q_0, q_1, q_2, q_3, q_4, r, each R_2, each R_3, each R_4, and each R_5 are independently selected from hydrogen, linear C_1-C_{20} alkyls, branched C_1-C_{20} alkyls, cyclic C_1-C_{20} alkyls, polycyclic C_1-C_{20} alkyls, aromatic groups, halogens, and sulfur-containing substituents; in formula (VI) when r is hydrogen at least one of q_1, q_2, q_3, and q_4 is hydrogen; and in formula (VII) when r is hydrogen at least one of q_1 and q_2 is hydrogen.

14. The method of claim 11, wherein the plurality of monomers further comprises monomers having formula (V)



(V)

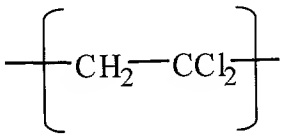
wherein R_6 is hydrogen or methyl; and R_7 is –CN or -COOR'", and wherein R'" is H, or a C_1-C_6 alkyl.

15. The method of claim 14, wherein R_7 is -COOH or $-COOCH_3$.

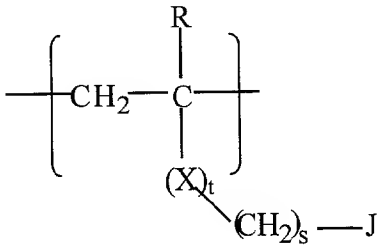
16. A packaging article, comprising:

an oxidation catalyst; and

at least one oxygen barrier layer comprising an oxygen barrier copolymer, wherein the oxygen barrier copolymer comprises repeating units having the formula (I), and repeating units having formula (II)



(I)



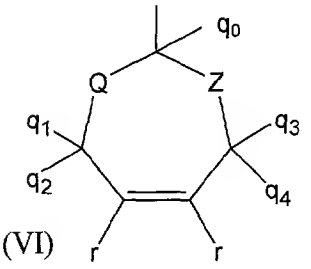
(II)

wherein R is hydrogen or methyl; X is –(C=O)-O-, -O-(C=O)-, -(C=O)-NH-, -O-; t is 0 or 1; s is an integer between 0 and 12, inclusive; J is a cycloalkenyl group; and

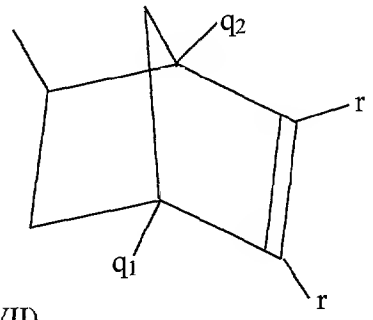
wherein the oxygen barrier copolymer comprises at least about at least about 50 mole% of repeating units having the formula (I) and at least about 5 mole% of repeating units having formula (II).

17. The packaging article of claim 16, wherein J is selected from substituted cyclohexenyls, unsubstituted cyclohexenyl, substituted norbornenyls, and unsubstituted norbornenyl.

18. The packaging article of claim 16, wherein J is selected from chemical groups having the formula (VI) or the formula (VII)



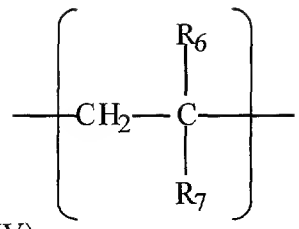
(VI)



(VII)

wherein Q is $-(CR_2R_3)_n-$; n is an integer from 0 to 3, inclusive; Z is $-(CR_4R_5)_e-$; e is an integer from 0 to 3, inclusive; $n + e \leq 3$; q_0, q_1, q_2, q_3, q_4, r, each R_2, each R_3, each R_4, and each R_5 are independently selected from hydrogen, linear C_1-C_{20} alkyls, branched C_1-C_{20} alkyls, cyclic C_1-C_{20} alkyls, polycyclic C_1-C_{20} alkyls, aromatic groups, halogens, and sulfur-containing substituents; in formula (VI) when r is hydrogen at least one of q_1, q_2, q_3, and q_4 is hydrogen; and in formula (VII) when r is hydrogen at least one of q_1 and q_2 is hydrogen.

19. The packaging article of claim 16, wherein the copolymer further comprises a plurality of units having formula (IV)



(IV)

wherein R_6 is hydrogen or methyl, and R_7 is –CN or -COOR", and wherein R" is H or a C_1-C_6 alkyl.

20. The packaging article of claim 19, wherein R_7 is -COOH or $-COOCH_3$.

21. The packaging article of claim 16, wherein the packaging article consists essentially of a single layer.

22. The packaging article of claim 16, wherein the packaging article comprises an oxidation catalyst.

23. The packaging article of claim 22, wherein the oxidation catalyst is a component of at least one of the oxygen barrier layer or a layer adjacent to the oxygen barrier layer.

24. The packaging article of claim 22, wherein the oxidation catalyst comprises a transition metal selected from cobalt, copper, nickel, iron, manganese, rhodium, or ruthenium.

25. The packaging article of claim 16, wherein the oxygen barrier layer further comprises at least one material selected from photoinitiators and antioxidants.

26. The packaging article of claim 16, wherein the oxygen barrier layer further comprises polyvinylidene chloride polymer blended with the oxygen barrier copolymer.

27. The packaging article of claim 16, wherein the oxygen barrier copolymer comprises between about 5 mole% and 30 mole% of repeating units having formula (II).

28. The packaging article of claim 16, further comprising an additional oxygen barrier layer.

29. The packaging article of claim 28, wherein the additional oxygen barrier layer comprises an oxygen barrier polymer selected from vinyl alcohol polymers, polyesters, vinylidene chloride polymers, epoxy polymers, polysulfones, acrylonitrile polymers, isocyanate polymers, and polyamides.

30. The packaging article of claim 16, further comprising a structural layer.

31. The packaging article of claim 30, wherein the structural layer comprises PET, polyamide, polypropylene, polyethylene, polyvinyl chloride, ethylene-vinyl acetate, ethylene-alkyl (meth)acrylates, ethylene-(meth)acrylic acid, ethylene-(meth)acrylic acid ionomers, paperboard, or cardboard.

32. The packaging article of claim 16, further comprising an oxygen scavenging layer.

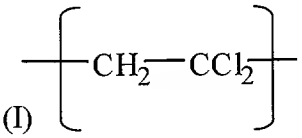
33. The packaging article of claim 32, wherein the oxygen scavenging layer is a liner, coating, sealant, gasket, adhesive insert, non-adhesive insert, or fibrous mat insert in the packaging article.

34. The packaging article of claim 33, wherein the oxygen scavenging layer comprises an oxygen scavenging polymer selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA).

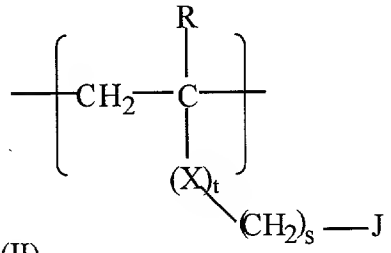
35. A method of preparing an oxygen barrier composition, comprising:

blending a mixture comprising a polyvinylidene chloride polymer, an oxidation catalyst, and an oxygen barrier copolymer to produce an oxygen barrier composition, wherein the oxygen barrier copolymer comprises

repeating units having the formula (I), and repeating units having formula (II)



(I)



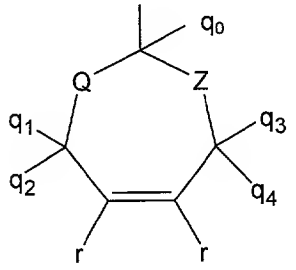
(II)

wherein R is hydrogen or methyl; X is –(C=O)-O-, -O-(C=O)-, -(C=O)-NH-, -O-; t is 0 or 1; s is an integer between 0 and 12, inclusive; J is a cycloalkenyl group; and

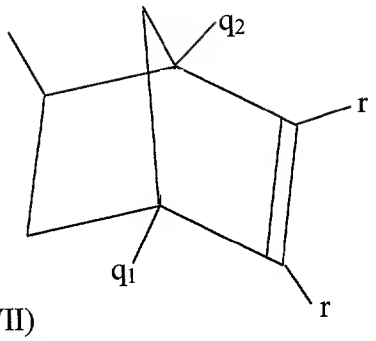
wherein the oxygen barrier copolymer comprises at least about at least about 50 mole% of repeating units having the formula (I) and at least about 5 mole% of repeating units having formula (II).

36. The method of claim 35, wherein J is selected from substituted cyclohexenyls, unsubstituted cyclohexenyl, substituted norbornenyls, and unsubstituted norbornenyl.

37. The method of claim 35, wherein J is selected from chemical groups having the formula (VI) or the formula (VII)



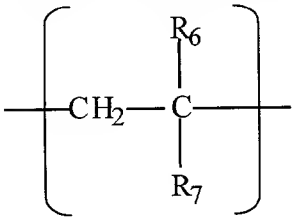
(VI)



(VII)

wherein Q is $-(CR_2R_3)_n-$; n is an integer from 0 to 3, inclusive; Z is $-(CR_4R_5)_e-$; e is an integer from 0 to 3, inclusive; $n + e \leq 3$; q_0, q_1, q_2, q_3, q_4, r, each R_2, each R_3, each R_4, and each R_5 are independently selected from hydrogen, linear C_1-C_{20} alkyls, branched C_1-C_{20} alkyls, cyclic C_1-C_{20} alkyls, polycyclic C_1-C_{20} alkyls, aromatic groups, halogens, and sulfur-containing substituents; in formula (VI) when r is hydrogen at least one of q_1, q_2, q_3, and q_4 is hydrogen; and in formula (VII) when r is hydrogen at least one of q_1 and q_2 is hydrogen.

38. The method of claim 31, wherein the copolymer further comprises a plurality of units having formula (IV)



(IV)

wherein R_6 is hydrogen or methyl, and R_7 is –CN or -COOR", and wherein R" is H or a C_1-C_6 alkyl.

39. The method of claim 38, wherein R_7 is -COOH or $-COOCH_3$.

40. The method of claim 35, wherein the oxidation catalyst comprises a transition metal selected from cobalt, copper, nickel, iron, manganese, rhodium, or ruthenium.

41. The method of claim 35, wherein the mixture further comprises at least one material selected from photoinitiators and antioxidants.